

## **Trapping Methyl Bromide on Activated Carbon**

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With the possibility that some uses of methyl bromide may be retained beyond the deadline of withdrawal in 2001, it is important that we develop methods which reduce the amount of methyl bromide used as well as the emissions of that which we do use into the atmosphere. By capturing or recycling the methyl bromide used in commodity fumigations, we can achieve the intent of the law by keeping methyl bromide out of the atmosphere where it might deplete ozone.

Under a Cooperative Research and Development Agreement (CRADA), for the past 2 years, research has been conducted on the trapping of methyl bromide on activated carbon following the chamber fumigation of post-harvest commodities. The concept for this technology is to capture 95% of the available methyl bromide following fumigation on activated carbon by pulling the aeration stream across a bed of activated carbon. When the carbon capacity is exhausted, the carbon will be transported to a desorption site where the methyl bromide will be desorbed and combusted to a bromide salt while the carbon is reactivated for reuse in adsorbing methyl bromide.

Research conducted in the laboratory identified the best type of carbon for the process and isolated the effects of temperature and RH of the effluent stream on the loading of methyl bromide on the carbon. It was found that with RH ranging from 10 to 98%, and temperatures ranging from 5 to 25°C, loading was still acceptable at from 8 to 16% (g. methyl bromide/100g. of carbon). Test results with oranges indicated that fruit volatiles had no effect on the loading of methyl bromide on the carbon even after several cycles of adsorption/desorption.

These laboratory studies led to the building of a pilot adsorber which operated on our 500ft<sup>3</sup> chamber at the laboratory. Tests with this pilot desorber were designed to verify the laboratory results we had obtained on a 3-inch diameter column in the lab. Indeed, after testing different conditions of an effluent stream coming from the chamber, our results from the laboratory were shown to apply to a larger scale adsorption unit. Having tested this unit, Great Lakes Chemical Corporation, the largest producer of methyl bromide in the U. S. joined our CRADA in 1997 to test a redesigned pilot unit in actual fumigations around the country. The new pilot unit was used in different fumigation conditions and on different commodities to test the validity of the data collected so far and to test a variety of actual conditions. The first site where tested was conducted at a fig processing facility in Fresno. This year we further tested this unit on commodities at port facilities in San Pedro, CA and on the east coast at several locations.

The final use of this adsorption unit may help pave the way to amending the Clean Air Act now that there is technology to greatly reduce the emission of methyl bromide to the atmosphere following commodity fumigation. The development and optimization of this adsorption unit that will capture 95% of the available methyl bromide following a commodity fumigation.